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➤ Only the Westlaw citation is currently available.

United States District Court,
W.D. Tennessee, Western Division.
LECTROLARM CUSTOM SERVICES, INC., Plain-
tiff,
v.
VICON INDUSTRIES, INC., et al., Defendants.
No. 03-2330 MA/A.

Sept. 2, 2005.

Gianni Minutoli, Deanna Allen, Dipu A. Doshi, Gary M. Hoffman, John C. Snodgrass, Kenneth Brothers, Laurence E. Fisher, Rachael Lea Leventhal, Dickstein Shapiro Morin & Oshinsky LLP, Washington, DC, Kemper B. Durand, Thomason Hendrix Harvey Johnson & Mitchell, Memphis, TN, for Plaintiff.

James Edward Hanft, Lee A. Goldberg, Michael J. Sweedler, Darby & Darby, Mark I. Koffsky, David W. Whealan, Goodwin Procter LLP, New York, NY, John J. Mulrooney, Crone & Mason, PLC, Earle J. Schwarz, Glankler Brown, PLLC, Douglas F. Halijan, Burch Porter & Johnson, Robert E. Craddock, Jr., Wyatt Tarrant & Combs, Memphis, TN, Douglas C. Daskocil, J. Anthony Downs, John C. Englander, Paul F. Ware, Jr., Goodwin Procter LLP, Boston, MA, Rebecca W. Bacon, Sean W. Gallagher, Steven J. Nachtwey, Alan E. Littmann, Bartlit Beck Herman Palenchar & Scott, Chicago, IL, Albert L. Underhill, Erik G. Swenson, Rachel C. Hughey, Merchant & Gould PC, Minneapolis, MN, for Defendants.

MEMORANDUM OPINION AND ORDER ON
MARKMAN MOTION AND ORDER DENYING
DEFENDANTS' MOTION FOR SUMMARY
JUDGMENT OF INVALIDITY OF CLAIMS 6 AND

7

MAYS, J.

*1 Before the court is the parties' request for patent claim construction under Markman v. Westview In-

struments, Inc., 52 F.3d 967 (Fed.Cir.1995), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Plaintiff Lectrolarm Custom Systems, Inc. ("Lectrolarm") filed a "Proposed *Markman* Findings of Fact and Conclusions of Law," on February 25, 2004. Defendants Bosch Security Systems, Inc. ("Bosch"), Vicon Industries, Inc. ("Vicon"), GE Interlogix, Inc. ("GE") and Sensormatic Electronics Corporation ("Sensormatic") (collectively the "Defendants") filed a "Memorandum of Law on Claim Construction," on March 16, 2004.^{FN1} Defendants GE and Bosch filed a "Supplemental Claim Construction Brief ... on 'Controlling Means' Limitation of Claims 2-5," on March 16, 2004. Defendants Sensormatic and Vicon filed a "Supplemental Memorandum of Law on Claim Construction of 'Controlling Means' in Claim 2," on March 16, 2004. Lectrolarm filed a "Reply to Defendants' Memorandum of Law on Claim Construction," on April 2, 2004. The court held a *Markman* hearing on claim construction on September 30, 2004. On October 15, 2004, Lectrolarm filed a "Post-*Markman* Hearing Brief on Claim Construction," and the Defendants filed a "Post-Hearing Memorandum Concerning Claim Interpretation Issues."^{FN2}

FN1. Defendants Matsushita Electric Corporation and Sony Electronics, Inc. also filed the Memorandum. Both defendants have since been dismissed.

FN2. On January 28, 2005, the Defendants filed a "Petition for Reexamination" of the patent in issue with the United States Patent and Trademark Office. Lectrolarm filed a "Supplemental *Markman* Brief," on February 17, 2005, in which it pointed out alleged inconsistencies between the positions the Defendants adopted in the petition and the positions the Defendants "previously adopted and advocated to this Court." (Lectrolarm's Supp. *Markman* Brief at 1.) The Defendants responded by filing a "Supplemental Claim Construction Brief," on March 14, 2005, in which the Defendants state: "[t]he Court did not request or authorize supplemental briefing on claim interpretation, and Lectrolarm

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neither conferred with Defendants nor sought leave from the Court before filing. In the event the Court accepts additional briefing, Defendants submit this supplemental brief in response.” (Def.’s Supp. Claim Construction Brief at 1.) This supplemental brief prompted Lectrolarm to file a “Response to Defendants’ Supplemental Claim Construction Brief,” on March 30, 2005.

The deadline for the submission of supplemental briefs on claim construction was October 15, 2004, and the court knows of no reason that arguments made by a party in a “Petition For Reexamination” to the United States Patent and Trademark Office should have a bearing on the court’s claim construction analysis under *Markman*. Neither of Lectrolarm’s briefs submitted after October 15, 2004, explains why this should be so. Therefore, the court will not consider any of the supplemental briefs on claim construction filed after October 15, 2004.

Also before the court is the Defendants’ March 5, 2004, “Motion For Summary Judgment of Invalidity of Claims 6 and 7 of U.S. Patent No. 4,974,088 as Indefinite Under 35 U.S.C. § 112 ¶ 2.” Lectrolarm filed a response on April 8, 2004. The court heard oral arguments on the summary judgment motion at the September 30, 2004, *Markman* hearing. For the following reasons, the court construes the claims as follows and DENIES the motion for summary judgment.

I. Background

On November 27, 1990, the United States Patent and Trademark Office (“PTO”) issued U.S. Patent No. 4,974,088 (the “’088 patent”), entitled “Remote Control Apparatus for a Rotating Television Camera Base,” to inventor Takeshi Sasaki. The technology at issue is an apparatus that uses computer memory and digital communication to allow remote control “rotation of a monitoring television camera in the horizontal and vertical directions.” U.S. Patent No. 4,974,088, Column 1:6-8. The patent was originally assigned to Maruwa Electronic & Chemical Company (“Maruwa”). Maruwa assigned the patent to Lec-

trolarm. Lectrolarm alleges that the Defendants have infringed the ‘088 patent.^{FN3}

FN3. Originally there were 14 defendants; four remain.

II. Legal Standard For Claim Construction

A patent is a fully integrated written instrument, and claim construction is a matter of law for the court. *See Markman*, 52 F.3d at 978. “It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed.Cir.2005) (internal quotes and citations omitted). Claim terms should be given their ordinary and customary meaning unless the patentee acts as his own lexicographer and, either explicitly, or by implication, uses the specification to give a particular definition to a term. *See Bell Atlantic Network Services, Inc. v. Covad Communications Group, Inc.*, 262 F.3d 1258, 1268 (Fed.Cir.2001) (quoting *Vitronics Corp. v. Conceptor, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996)).

*2 The ordinary and customary meaning of a term may be determined by considering what a person of ordinary skill in the art would have considered the term to mean at the time of invention, not the subjective intent of the patentee. *Markman*, 52 F.3d at 986. “[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313. When “determining the ordinary and customary meaning of a claim requires examination of terms that have a particular meaning in a field of art”, then “the court looks to ‘those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean.’ Those sources include ‘the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.’” *Id.* at 1314 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1116 (Fed.Cir.2004)); *see also Vitronics*, 90 F.3d at 1582 (holding that intrinsic evidence such as the claims themselves, the

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specification and the prosecution history should be the primary source of guidance about the meaning of claim terms).

Although claims should always be read in the context of the specification, the scope of a claim should not be limited to specific embodiments disclosed in the specification. *See, e.g., Ekchian v. Home Depot, Inc.*, 104 F.3d 1299, 1303 (Fed.Cir.1997). The prosecution history should be consulted because the patentee may not advocate an interpretation which he had earlier disavowed in order to obtain allowance. *See Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452 (Fed.Cir.1985).

Where intrinsic evidence is dispositive, extrinsic evidence, such as expert testimony, inventor testimony, and prior art, should not influence the court's claim interpretation. *Vitronics*, 90 F.3d at 1584. In cases, however, where "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words ... general purpose dictionaries may be helpful." *Phillips*, 415 F.3d at 1313. But, a dictionary definition may not be relied on if it "contradict[s] any definition found in or ascertained by a reading of the patent documents." *Vitronics*, 90 F.3d at 1584 n. 6.

Construction of means-plus-function claims written under 35 U.S.C. § 112, ¶ 6 is also a matter of law for the court. *See Linear Technology Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1318 (Fed.Cir.2004). "In construing a means-plus-function claim limitation, the recited function within that limitation must first be identified. Then, the written description must be examined to determine the structure that corresponds to and performs that function." *Gemstar-TV Guide Intern., Inc. v. International Trade Com'n*, 383 F.3d 1352, 1361 (Fed.Cir.2004) (internal quotes and citations omitted). Consequently, these claims are an exception to the rule that the scope of a patent claim is not limited by the embodiments disclosed in the specification.

III. Prior Litigation Involving the '088 Patent

*3 This is not the first time a court has been asked to construe claims of the '088 patent. In a prior action, styled *Lectrolarm v. Pelco* (the "Pelco suit"), Judge Wanger of the Eastern District of California (the "Pelco court") entered a 107 page "Amended Memorandum Decision and Order Re: Claim Interpretation After Markman Hearing" (the "Pelco decision") construing Claims One through Five of the '088 patent. Following the Pelco court's Markman construction, the parties settled. (Lectrolarm's Proposed Markman Findings of Fact and Conclusions of Law (hereinafter "Pl.'s Br.") at 6.) Lectrolarm urges the court to adopt the Pelco decision in its entirety. (*Id.* at 1-3.) Not surprisingly, the Defendants argue against wholesale adoption of the Pelco decision. (D.'s Mem. of Law on Claim Construction (hereinafter "D.'s Br.") at 3-4.) The parties agree that the Pelco decision should be used as a starting point for this court's claim construction analysis.

The court will not adopt the Pelco decision in its entirety. Intra-jurisdictional uniformity in claim interpretation is an important goal of the patent system that is achieved through review of federal district courts' claim construction orders in a single appellate court. *See Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390-91, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996) (finding that intra-jurisdictional uniformity in the treatment of patents is promoted by applying stare decisis to the decisions of the single patent appellate court). Because the parties in the Pelco litigation settled after the district court had entered its Markman order, the Pelco decision was never reviewed by the Federal Circuit. Consequently, the Pelco decision has no stare decisis effect on this court. Because the Pelco decision was not reviewed by the Federal Circuit, it cannot be viewed as a final order for purposes of collateral estoppel.

Even if the Pelco decision were binding on this court, the court would have a responsibility to construe terms in the patent that were not at issue in Pelco. *See Phonometrics, Inc. v. Northern Telecom, Inc.*, 133 F.3d 1459, 1464 (Fed.Cir.1998) (finding that an earlier Federal Circuit order construing patent claims was "merely dictum" as to terms that had not been at issue in the earlier litigation).

IV. The Invention

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The *Pelco* court described the invention of the '088 patent: ^{FN4}

^{FN4}. Although the *Pelco* decision is not binding, the court has adopted parts of that decision where doing so is expedient and does not abdicate the court's responsibility to review the parties' substantive claims.

The patented Spector pan and tilt security camera systems involved in this lawsuit are used at retail, industrial, military, correctional, and other sites that require remote visual monitoring. These security cameras are mounted in a way that they may be rotated in a horizontal direction ("panned") or rotated in a vertical direction ("tilted"). Spector security cameras are controlled by digital signals making installation easy and manufacturing economical. Prior to the patented invention, the pan and tilt operations were controlled through the use of servo motors using analog feedback signals. The analog operating signals were sent through many different signal lines making installation complicated, and operation susceptible to noise.

*4 ...

The '088 Patent claims a remote control apparatus for regulating the horizontal and vertical rotation of a television camera. The invention calls out a remote control box with a computer intelligence that is used to input and send position data to a second computerized unit at the camera base. The computer units control the operation of the camera according to pre-programmed instructions inputted through an operating panel connected to the remote control box. The movement of the camera base is driven by a drive circuit and stepper motors. The invention allows automatic operation of the remote camera without a monitoring person. It also provides for detection of abnormal conditions by external signals attached to the camera base by rotating the camera to pre-determined locations or sending a visual alert signal to the operating panel. Electronic "noise" is reduced, in part, because instead of a plurality of signal lines connecting the control box to the camera base, only two signal lines (three wires including the ground wire) are required.

The remote control box contains a modulating circuit that modulates the digital signal from the control box's central processing unit ("CPU") before it travels to the camera base over the signal lines. Modulating the signal provides a harder, more noise-resistant signal that requires only two wires and can travel over greater distances than previously available. A demodulating circuit within the camera base recovers the digital signal for processing by the CPU in the camera base. The recovered digital signal is processed, and further digital signals are generated from the camera base CPU and sent to drive circuit and motors that control the rotation of the camera.

Pelco Decision at 3-6 (quotes and citations omitted).

In addition to modulation, the '088 patent claims an invention where communication between the control box and the camera base is accomplished using pairs of light receiving and light transmitting elements called photocouplers.^{FN5} Photocouplers may be used to transmit digital data between the control box and the camera base as light pulses or electrical signals. In one case, complete photocouplers are placed on both the control box and the camera base and send signals between the two sides as electrical pulses with very little "noise" in the signal. *U.S. Patent No. 4,974,088*, Column 7:22-9:47. In another embodiment, the elements that comprise a photocoupler are split so that a light emitting element on one side of the invention sends data over an optical cable to a light receiving element on the other side of the invention. *Id.* at 9:53-62.

^{FN5}. The *Pelco* decision did not discuss the use of photocouplers because this method of practicing the invention is only discussed in Claims 6 and 7 of the '088 patent, which were not at issue in *Pelco*.

V. Claim Construction

A. Claim Language

The parties disagree about the proper construction of language found in six claims in the '088 patent. The claims containing disputed language provide as fol-

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lows, with the contested language underlined:

1. A remote control apparatus for a rotating *camera base* that supports a television camera such that it is rotatable in the horizontal and vertical directions, said remote control apparatus for a rotating camera comprising:

*5 a first controlling means that outputs a digital signal for driving and controlling said rotating camera base,

a *modem* for receiving and transmitting said digital signal outputted from said first controlling means for driving and controlling said rotating camera base, said *modem* including a *modulating circuit* and a *demodulating circuit*;

a control box including said *modulating circuit* that outputs the *modulated* version of the digital signal from said first controlling means with a prescribed *carrier wave*, said *modulating circuit* being electrically connected to said first controlling means,

said *demodulating circuit* that recovers the digital signal from the *modulated* input from said *modulating circuit* being provided in said rotating camera base and electrically connected to said *modulating circuit*, and

a second controlling means that drives and controls said rotating camera base based on the digital signal from said *demodulating circuit*, said second controlling means being electrically connected to said *demodulating circuit* of said *modem*.

2. A remote control apparatus for a rotating *camera base* that supports a television camera such that it is rotatable in the horizontal and vertical directions, said remote control apparatus for a rotating base comprising:

an *input means* for inputting the *operating data* for the *automatic operation* of said rotating camera base,

a *storing means* electrically connected to said *input*

means for storing the *operating data* inputted by means of said *input means*, said *storing means* including a *random access memory*, and

a *controlling means* that controls the *automatic operation* of the rotating camera base based on previously stored *operating data* stored in said *storing means*, said *controlling means* being electrically connected to said *storing means*

whereby operating data previously stored in said *storing means* is employed to automatically operate the rotating camera base in accordance with said previously stored operating data.

3. A remote control apparatus for a rotating *camera base*, as set forth in claim 2, wherein

said *input means* further includes a *second input means* for inputting the *home position data* used for making said rotating camera base rotate to prescribed home positions during *automatic operation*,

said *storing means* further stores the *home position data* inputted by means of aid [sic] *second input means*,

an instructing means is further provided for inputting to said *controlling means* the instruction signals for making said rotating camera base rotate to prescribed home positions during *automatic operation*, said instructing means being electrically connected to said *controlling means*,

said *controlling means* further makes said rotating camera base rotate to a prescribed home position during *automatic operation* according to the instruction signals from said instructing means, based on said home position data stored in said *storing means*.

*6 4. A remote control apparatus for a rotating *camera base*, as set forth in claim 2, wherein

said *input means* further includes a *second input means* for inputting the *home position data* used for making said rotating camera base rotate to

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prescribed home positions during *automatic operation*,

said *storing means* further stores the *home position data* inputted by means of said *second input means*,

external sensors that send an emergency signal to said *controlling means* are provided in said prescribed home positions and are electrically connected to said *controlling means*, and

said *controlling means* further makes said rotating camera base rotate to a prescribed home position based on the emergency signal sent from the external sensor and on said *home position data* stored in said *storing means*.

5. A remote control apparatus for a rotating *camera base*, as set forth in claim 4, that is further provided with

a *disabling means* that prevents, based on the emergency signal from said external sensors, said *controlling means* from making said rotating camera base rotate to a prescribed home position, said *disabling means* being electrically connected to said external sensor, and

a *display means* that shows the presence or absence of said emergency signal, said *display means* being electrically connected to said external sensor.

6. A remote control apparatus for a rotating *camera base* that supports a television camera such that it is rotatable in the horizontal and vertical directions, said remote control apparatus for a rotating camera base comprising

a control box that outputs an electrical signal for driving and controlling said rotating camera base, a *photocoupler* including a light-emitting element that transforms said electrical signal from said control box to a light signal, said light-emitting element being provided in said control box,

said *photocoupler* further including a light receiving element that transforms the light signal from said

light-emitting element to an electrical signal and outputs the electrical signal to said rotating camera base, said light receiving element being provided in said rotating camera base,

a transmitting means for transmitting the light signal from said light-emitting element to said light-receiving element, said transmitting means being provided between said control box and said rotating camera base, and

a controlling means that drives and controls said rotating camera base based on the signal from said light receiving element, said controlling means being provided in said rotating camera base and electrically connected to said light-receiving element.

U.S. Patent No. 4,974,088, Column 10:10-12:43.

Within these six claims the parties disagree about the meaning of eighteen terms. The court will construe only those parts of the claims actually in dispute. See U.S. Surgical Corp. v. Ethicon, Inc., 103 F.3d 1554, 1568 (Fed.Cir.1997).

B. Camera Base

*7 The preambles to all six claims contain the language “[a] remote control apparatus for a rotating camera base....” Lectrolarm argues that the preambles are limitations of the claims and proposes that “camera base” should be construed to mean “television camera base.” The Defendants argue that the preambles are not limitations of the claims, and would interpret “camera base” to mean “a base capable of supporting a camera.”^{FN6}

^{FN6} If the preambles are not claim limitations, as the Defendants argue, it is not clear why the Defendants have proposed a definition for the preambles.

“A claim preamble has the import that the claim as a whole suggests for it. If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is necessary to give life, meaning, and vitality to the claim, then the

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claim preamble should be construed as if in the balance of the claim.” *Pitney Bowes v. Hewlett Packard*, 182 F.3d 1298, 1305 (Fed.Cir.1999) (internal quotes and citations omitted); see also *In re Paulsen*, 30 F.3d 1475, 1479 (Fed.Cir.1994) (“terms appearing in a preamble may be deemed limitations of a claim when they give meaning to the claim and properly define the invention”). The preambles to claims one through six of the ‘088 patent give meaning to the claims. For example, claim two recites “an input means for inputting the operating data for the automatic operation of said rotating camera base.” U.S. Patent No. 4,974,088, Column 11:38-45. The words “said rotating camera base” refer back to the “camera base” in the preamble, and are only properly understood if the accompanying description of the camera base in the preamble is read as a limitation of the claim. All six of the claims include the language “said rotating camera base” referring the reader back to the description of the rotating camera base in the claims’ preambles.

Because the preambles are limitations of the claims, the court must construe the disputed language. The plain language of the term “camera base” is “camera base.” Neither the specification nor the prosecution history indicates that the patentees desired a different definition of this term. The Defendants have identified no reference to the base of the apparatus in the specification that contemplates any use other than in conjunction with a camera.

The Defendants attempt to use the specification to support their view by arguing that the “‘088 Patent does not describe any aspect of the camera itself, apart from the existence of zoom, focus, and iris motors. Instead the focus of the ‘088 Patent is the base itself and the control box, not what is on the camera base.” (D.’s Br. at 46.) As the title of the invention states, the patent is for a “Television Camera Base.” U.S. Patent No. 4,974,088 (emphasis added). Patenting an invention for a base for television cameras does not require discussing the details of the television cameras that will be mounted on that base.

The inventors, by the plain language used in the claims, limited patent ‘088 to bases for cameras. Nothing in the specification or prosecution history indicates otherwise. The court sees no reason to use a definition other than the plain meaning of the words

and construes “camera base” to mean “television camera base.”

C. And Equivalents Thereof

*8 The six disputed claims contain sixteen claims that the parties agree are means-plus-function claims. Lectrolarm asks the court to include in its construction of each of these claims the phrase “and equivalents thereof” following the court’s recitation of the corresponding structure in each claim. The Defendants argue that the phrase should not be included in the court’s construction of the claims.

According to the Patent Act, “[means-plus-function claims] shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” 35 U.S.C. § 112, ¶ 6 (emphasis added). The dispute between the parties centers on whether the court’s claim construction should make explicit that the Patent Act includes equivalents of corresponding structures within the scope of means-plus-function claims.

Claim construction involves “determining the meaning and scope of the patent claims asserted to be infringed.” *Markman*, 52 F.3d at 976. It follows that anything within the “meaning and scope” of a claim should be included in the court’s *Markman* order construing the claims. Equivalents of corresponding structures are required by statute to be within the scope of a means-plus-function claim. The court will include the language “and equivalents thereof” in its construction of all means-plus-function claims in the ‘088 patent.^{FN7}

^{FN7} The Federal Circuit sometimes includes the phrase “and equivalents thereof” when construing means-plus-function claims. See, e.g., *Animatics Corp. v. Quicksilver Controls, Inc.*, 102 Fed. Appx. 659, 670 (Fed.Cir.2004); *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1209 (Fed.Cir.2002).

D. Modulate; Carrier Wave; Modulate With a Carrier Wave; Modem; Modulating Circuit; Demodulating Circuit

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The construction of paragraphs three, four, five and six of claim one depends on the definitions of "modulate," "carrier wave," "modulate with a carrier wave," "modem," "modulating circuit," and "demodulating circuit."

1. Modulate

The Defendants propose that "modulate" be construed as follows:

"Modulation" requires that a characteristic of the carrier wave has been changed to represent the 1 and 0 values of the digital signal so that the voltage levels of the modulated signal in and of themselves do not represent the 1 and 0 values of the digital signal. Modulation involves more than simply encoding digital data in serial formats such as non-return to zero, return to zero, Manchester, or bi-phase. Demodulation involves more than simply decoding of digital data.

Lectrolarm argues that this definition improperly restricts the scope of the patent claim and is unnecessary. The issue revolves around the question of whether the coding of digital data into electrical pulses constitutes "modulation."

Technical dictionaries and treatises may help "a court to better understand the underlying technology and the way in which one of skill in the art might use the claim terms." *Phillips*, 415 F.3d at 1318 (internal quotes omitted). "Such evidence ... may be considered if the court deems it helpful in determining the true meaning of language used in the patent claims." *Id.* (internal quotes omitted). The Defendants have directed the court to the textbook *Digital Communications* for help in deciding the meaning of "modulation" to a person of skill in the art. *Digital Communications* was published in 1988, one year before the '088 patent was filed. The author of the textbook is Bernard Sklar, who is also an expert for Lectrolarm.

*9 At its most basic, a digital communication system operates as follows: 1) data enters the system; 2) if the data is not digital, it is represented by digital data through the process of formatting; 3) the digital data is

encoded onto a waveform for transmission through the process of modulation; 4) the modulated data is transmitted along some channel; 5) the transmitted data is removed from the waveform by the process of demodulation; 6) if the desired output of the process is not digital data then the digital data is formatted into whatever final form of data is desired. Bernard Sklar, *Digital Communications: Fundamentals and Applications* 54 (1988). Defendants argue that the process of encoding digital data into formats such as non-return to zero, return to zero, Manchester, or bi-phase is part of the process of formatting, not part of the process of modulation.

Formatting makes a "source signal compatible with digital processing." *Id.* at 52. These source signals are textual or analog data. *Id.* at 54. Digital data is already compatible with digital processing and does not need to be formatted. *Id.* The end result of formatting is a stream of binary digits known as pulse code modulation (PCM). *Id.* at 54, 73.

Modulation transforms digital data represented as PCM into waveforms that are compatible with transmission along a channel. *Id.* at 54, 118. For transmission along a cable or wire, called baseband transmission, the appropriate waveform is an electrical pulse. *Id.* at 54, 78. The most common types of pulse waveforms used in baseband transmission are non-return to zero, return to zero, and multilevel binary. *Id.* at 78. The phase encoded group consists of bi-phase and Manchester coding. *Id.* at 81.

The process of transmission over a channel that is not a cable or wire (such as radio transmission) is called bandpass transmission. *Id.* at 52. The appropriate waveform for bandpass modulation is a sinusoid. *Id.* at 118.

Sklar's textbook clearly states that modulation is encoding digital information onto a waveform, and one type of wave form is an electric pulse which includes non-return to zero, return to zero, Manchester, and bi-phase formats. Further, because modulation can result in a waveform that is simply a series of electrical pulses, modulation necessarily includes the process of encoding digital information into a format where the voltage level of the signal indicates whether the data being transmitted is a one or a zero.

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The description of "modulation" in Sklar's textbook is consistent with the IEEE Standard Dictionary of Electrical and Electronics Terms' (hereinafter the "IEEE Dictionary") definition of "modulation:"

(1)(A)(data transmission). (i) The process by which some characteristic of a carrier is varied in accordance with a modulating wave. (ii) The variation of some characteristic of a carrier. See also: angle modulation; modulation index. (B) (data transmission) (Signal transmission system). (i) A process whereby certain characteristics of a wave, often called the carrier, are varied or selected in accordance with a modulating function. (ii) The result of such a process. See also: angle modulation; modulation index.

*10 *IEEE Dictionary*, 662 (6th ed.1997). The IEEE dictionary does not exclude the process of encoding digital data as a series of electrical pulses from the definition of modulation.

A leading non-litigation induced treatise from 1988, *Digital Communications* by Bernard Sklar, coupled with the definition of modulation in the IEEE Dictionary make clear that the plain meaning of the term "modulate," to one skilled in the art in 1989, included representing digital data as electrical pulses coded into serial formats such as non-return to zero, return to zero, Manchester, or bi-phase.^{FN8} Neither the prosecution history nor the specification lead the court to conclude that the term "modulation" should be given a definition different from its plain and ordinary meaning. Therefore, the court will not use the Defendants' proposed definition.

^{FN8}. The Defendants support their position with excerpts of testimony from expert witnesses for both sides. The court need not consider this extrinsic evidence. The meaning of "modulation" to one of skill in the art in 1989 can be construed from non-litigation induced treatises and technical dictionary definitions.

2. Carrier Wave

Lectrolarm proposes that "carrier wave" should be construed to mean:

The term carrier wave is completely synonymous with the term carrier, which, to one skilled in the art in 1988, means wave. A carrier wave is a continuous electromagnetic wave, of sinusoidal or non-sinusoidal form, capable of being modulated or impressed with a signal.

Defendants propose that the court should construe carrier wave to include only the second sentence of Lectrolarm's proposed definition minus the word "electromagnetic." The IEEE Dictionary defines "carrier wave" as a synonym for "carrier." *IEEE Dictionary*, at 136. The IEEE Dictionary gives several definitions for carrier. Definition (5)(A) explicitly states that it applies to the use of the word "carrier" as a synonym for "carrier wave" and defines the terms as "a continuous frequency capable of being modulated or impressed with a signal." *IEEE Dictionary*, at 134-135.

The first sentence of Lectrolarm's proposed definition of carrier wave is superfluous. Although the IEEE Dictionary defines "carrier wave" as a synonym for "carrier," making this statement in the court's claim construction does not clarify the term for the fact finder. Similarly, whether "carrier" is a synonym for "wave" does not clarify the term for the fact finder. The court will not adopt the first sentence of Lectrolarm's proposed construction of "carrier wave."

The court next considers the use of the word "electromagnetic." The IEEE Dictionary defines "electromagnetic waves" as:

(1) Waves characterized by variations of electric and magnetic fields. Note: Electromagnetic waves are known as radio waves, heat rays, light rays, etc., depending on the frequency. (2) (radio wave propagation) Waves characterized by temporal and spatial variations of electric and magnetic fields.

IEEE Dictionary, at 346. The parties agree that the modulating and demodulating circuits are connected electrically (Pl.'s Br. at 39.); therefore, it must be possible for the carrier wave to be an electrical signal.

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The IEEE Dictionary definition does not include electrical pulses within its recitation of examples of electromagnetic waves. Lectrolarm has presented no arguments for including the word "electromagnetic" in the definition of "carrier wave." Therefore, the court will not adopt Lectrolarm's proposed inclusion of the word "electromagnetic" in the definition of "carrier wave."

*11 The court notes that, although the IEEE Dictionary definition of "carrier wave" does not specify whether a "carrier wave" can be sinusoidal or non-sinusoidal, the parties agree that the definition should include the language "of sinusoidal or non-sinusoidal form." Neither the specification nor the prosecution history narrows the scope of the term "carrier wave" from its ordinary meaning to a person of skill in the art. Consistent with the IEEE Dictionary, the court defines "carrier wave" as "a continuous wave, of sinusoidal or non-sinusoidal form, capable of being modulated or impressed with a signal."

3. Modulate With a Carrier Wave

The Defendants again argue that the patent claims do not include "encoding digital data in serial formats such as non-return to zero, return to zero, Manchester, or bi-phase" by stating that "modulation with a carrier wave" (discussed in Claim 1, ¶ 4)^{FN9} does not include these types of waveforms. (Df.'s Post-Hearing Mem. Concerning Claim Interpretation Issues at 11-12.) The Defendants refer to the following language from the textbook *Digital Communications*:

FN9. The operative claim language is "outputs the modulated version of the digital signal ... with a prescribed carrier wave..." U.S. Patent 4,974,088, Column 10:23-26.

[i]n the case of baseband modulation, [the] waveforms are pulses, but in the case of bandpass modulation the desired information signal modulates a sinusoid called a carrier wave, or simply a carrier.

Digital Communications at 118.

As already discussed, encoding digital data onto a pulse waveform in a format such as non-return to zero,

return to zero, Manchester, or bi-phase is a form of modulation called baseband modulation. *Id.* at 78. Bandpass modulation, as the cited text discusses, involves formatting digital data onto a sinusoid. The cited passage from *Digital Communications* treats "sinusoid" and "carrier wave" as synonyms. The definition of carrier wave that the court has adopted, however, explicitly acknowledges that "carrier wave" and "sinusoid" are not synonyms. The *Digital Communications* text uses the term "carrier wave" inconsistently with the definitions of "carrier wave" proposed by both the Defendants and Lectrolarm.

The court has determined that modulation includes encoding digital data onto waveforms that are both electrical pulses and sinusoids. The court has also adopted a definition of carrier wave that includes both sinusoidal and non-sinusoidal waveforms. Consequently, "modulation onto a carrier wave" includes encoding digital data onto a pulse waveform in a format such as non-return to zero, return to zero, Manchester, or bi-phase.

4. Modem / Modulating Circuit / Demodulating Circuit

Lectrolarm proposes that the definitions of "modem," "modulating circuit" and "demodulating circuit" include the language "continuous frequency capable of being modulated or impressed with a signal" at various places in their construction. The Defendants would instead use the term "carrier wave." Lectrolarm's proposed language is essentially the definition of "carrier wave" adopted by the court. The court will use the term "carrier wave" where appropriate in the definitions of "modem," "modulating circuit," and "demodulating circuit."

E. The Input Means (Claim 2, ¶ 2); Automatic Operation; Operating Data

*12 The parties agree that the function of the input means should be defined as "the function of the input means is to input operating data for the automatic positioning of the rotating camera base." The parties disagree about which structures disclosed in the specification constitute the structure of the input means. The parties also disagree about the definitions of "automatic operation" and "operating data" within

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the description of the function.

1. The Structure of the Input Means

Lectrolarm proposes that the structure of the input means be "the control pad and a set of buttons and switches (it can include button or switch they input including pan speed or tilt speed, and would include interval scan switches) on the operating panel." Defendants would like the structure of the input means to be "the user interface to the transmit side CPU, which includes the control pad and a set of buttons and switches by which the user operates the controls in a manner that defines the automatic operation."

The specification identifies several structures involved in inputting operating data for the automatic operation of the camera base. These structures include the control pad, memory set and clear buttons, and switches for controlling the panning and tilting speeds, mode of automatic operation, and stopping interval. U.S. Patent No. 4,974,088, Column 3:52-4:18.

The Defendant's argue that the "user interface to the transmit side CPU" should be included in the court's construction of the structure of the input means. Including this language would be wrong for two reasons. First, the term "user interface" is not defined. The court will define the corresponding structure using only structures clearly described in the specification. Second, construction of the corresponding structure of a means-plus-function claim should not include any structures from the written description beyond those necessary for actually performing the function. Micro Chemical, Inc. v. Great Plains Chemical Co., Inc., 194 F.3d 1250, 1257-1258 (Fed.Cir.1999). The Defendants have not defined the "user interface," and the court is concerned that it might include structures that do not play a direct role in the function of inputting operating data.

Based on the structures that the '088 patent specification describes as performing the function of inputting operating data for automatic operation, the court defines the structure of the input means as: "the control pad and a set of buttons and switches (including switches for inputting pan and tilt speeds, the interval scan switch, the memory set and clear buttons, and

switches for setting the particular mode of automatic operation) on the operating panel."

2. Automatic Operation

Lectrolarm proposes that "automatic operation" be construed to mean "the automatic reciprocating motion of the camera between defined points." The Defendants would interpret "automatic operation" to mean "movement of the camera base that is not directly responsive to input from a monitoring person (other than initiation of the automatic operation)."

*13 Both Lectrolarm and the Defendants agree that "'automatic operation,' as typically understood in the field of electronics, refers to the operation of some structure without human intervention." (Pl.'s Br. at 53.) Lectrolarm argues that the scope of the definition of "automatic operation" was narrowed in the specification by the language "[d]uring automatic operation, the television camera 7 undergoes rectilinear motion between the two points A and B regardless of the path of rotation in scanning..." U.S. Patent 4,974,088, Column 5:57-60.

The court agrees that the specification consistently uses the term "automatic operation" to refer to motion of the camera between pre-set points. This is not, however, the meaning of the definition Lectrolarm has proposed. Lectrolarm's definition includes the term "reciprocating motion." Webster's defines "reciprocating" as "to move forward and backward alternately." *Webster's Revised Unabridged Dictionary*, 1998. One of the modes of automatic operation described in the specification involves directing the camera to a pre-defined position when an alarm is triggered. U.S. Patent No. 4,974,088, Column 6:28-40. This aspect of the camera's automatic operation does not involve "reciprocating motion."

The parties agree that the plain meaning of "automatic operation" is movement without human intervention. The specification does not limit the plain meaning of the claim in the manner that Lectrolarm proposes. The court construes "automatic operation" as "movement of the camera base that is not directly responsive to input from a monitoring person (other than initiation of the automatic operation)."

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3. Operating Data

Lectrolarm proposes that “operating data” should be construed to mean:

the data inputted by the user through the control pad, buttons, and switches on the operating panel that direct the automatic reciprocating motion of the camera between defined points. The operating data must include at least position data (represented by angles of rotation, polar coordinates, or any other suitable units) and stopping interval data. Operating data may also include data specifying speed of rotation, pan and tilt at the discretion of the user.

The Defendants would interpret “operating data” to mean:

information that the controlling means uses to control the automatic operation. Operating data is not necessarily input directly by the user, but can be derived from the manner in which the user uses the system.

The plain language of Claim 2, ¶ 2 requires that “operating data” be data that 1) is input using the structure of the input means and 2) that directs the automatic operation of the camera. U.S. Patent 4,974,088, Column 10:43-45.

The definition of “operating data,” however, must be narrowed from the plain language of the claim. The patent describes two different types of automatic operation. The first is “rectilinear motion [of the camera] between two points A and B....” U.S. Patent No. 4,974,088, Column 5:57-59. The second type involves automatically directing the camera to a pre-set home position when an alarm is triggered. U.S. Patent No. 4,974,088, Column 6:28-40. Claim 3, ¶ 2 describes “home position data used for making said rotating camera base rotate to prescribed home positions during automatic operation.” U.S. Patent No. 4,974,088, Column 8:61-64. To give separate meaning to the terms “operating data” and “home position data,” “operating data” cannot be the data used in all types of automatic operation, but must only refer to the data used during automatic rectilinear motion of the camera base between points A and B.

*14 Lectrolarm would like the court to include the language “the data inputted by the user through the control pad, buttons, and switches on the operating panel” in its definition of “operating data.” That language is not appropriate. First, there is no need to recite the structure of the input means, which has already been defined. Second, the specification does not describe the user as “inputting” the “operating data.” It describes the user as “setting” the operating data. U.S. Patent No. 4,974,088, Column 3: 59-60; 5:22-24.

Lectrolarm would also like the court to include the language “the operating data must include at least position data (represented by angles of rotation, polar coordinates, or any other suitable units) and stopping interval data. Operating data may also include data specifying speed of rotation, pan and tilt at the discretion of the user” in its definition of “operating data.” There is no basis in the patent for the court to include this language. The patent does not speak to the nature of the data saved, but provides only that it is saved through use of the input means.

The court also declines to accept the Defendants’ proposed definition because it is overly broad. The Defendants propose stating that “operating data is not necessarily input directly by the user, but can be derived from the manner in which the user uses the system.” The claims and specification make clear that the operating data is set through use of the input means. The Defendants proposed construction opens the door for use of structures other than the input means to set the operating data stored in the system.

Based on the patent claims and the specification, the court defines operating data as “data that controls the automatic operation of the camera base, and that is set through use of the structure of the input means.”

F. The Second Input Means (Claims 3, ¶ 2; Claim 4, ¶ 2); Home Position Data

Paragraph 2 of both Claims 3 and 4 claims a “second input means.” The parties disagree about the construction of the function and the structure of the second input means. The parties also disagree about the

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definition of the term "home position data" used in the construction of the claim.

1. Function of the Second Input Means

Lectrolarm proposes that the function of the second input means "is to input home position data necessary to tell the camera how to move into desired home positions." The Defendants would like the function of the second input means to be "to input home position data." Lectrolarm's proposed construction is overly complex. There is no need to discuss the purpose of "home position data" to understand the function of the second input means. The court adopts the Defendants' position and construes the function of the second input means to be "to input home position data."

2. Structure of the Second Input Means

Lectrolarm proposes that the structure of the second input means "is the control pad and a set of buttons (including home position buttons) and switches on the operating panel." The Defendants would like the structure of the second input means to be "the user interface to the transmit side CPU, which includes the control pad and a set of buttons and switches by which the user operates the controls in a manner that defines the home position."

*15 The specification identifies several structures involved in inputting home position data. These structures include the control pad and home position buttons. U.S. Patent No. 4,974,088, Column 5:66-6:13.

The Defendants argue that the "user interface to the transmit side CPU" should be included in the court's construction of the structure of the second input means. Including this language would be wrong for two reasons. First, the term "user interface" is not defined. The court will define the corresponding structure using only structures clearly described in the specification. Second, construction of the corresponding structure of a means-plus-function claim should not include any structures from the written description beyond those necessary for actually performing the function. Micro Chemical, 194 F.3d at 1257-1258. The Defendants have not defined the "user interface" and

the court is concerned that it might include structures that do not play a direct role in the function of inputting home position data.

Based on the structures that the '088 patent specification describes as performing the function of inputting home position data, the court defines the structure of the input means as: "the control pad and a set of buttons (including home position buttons) and switches on the operating panel."

3. Home Position Data

Lectrolarm proposes that "home position data" should be construed to mean "information (represented by angles of rotation, polar coordinates, or any other suitable units) necessary to specify the locations of prescribed home positions. Home position data is inputted by the user through the control pad, buttons (including the home position buttons), and switches on the operating panel." The Defendants would interpret "home position data" to mean "information identifying one or more home positions. 'Home position' is a stored position." The parties agree that "home position data" is information that specifies the position of, or identifies, home positions.

The first parenthetical in Lectrolarm's proposed definition, "(represented by angles of rotation, polar coordinates, or any other suitable units)," has no basis in the specification. The patent does not speak to the nature of the data saved to identify the home positions.

The second sentence of Lectrolarm's proposed definition, describing how "home position data" is entered into the system, is unnecessary. The court's construction of the function of the second input means already discusses the manner in which "home position data" is inputted.

The court defines "home position data" as "information identifying one or more home positions that is set through use of the structure of the second input means. 'Home position' is a stored position."

G. The Storing Means (Claim 2, ¶ 3; Claim 3, ¶ 3; Claim 4, ¶ 3); Random Access Memory

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Claim 2, ¶ 3 claims a “storing means.” Paragraph 3 of both Claims 3 and 4 refer back to the “storing means” of Claim 2. The parties agree that the claim for a “storing means” is in means-plus-function form. The parties disagree on the correct construction of both the function and the structure of the “storing means.” The parties also disagree on the definition of “random access memory” used in both parties’ proposed constructions of the function of the storing means.

1. The Function of the Storing Means

*16 Patent Claims 2, 3 and 4 disclose two functions of the storing means: the first involving operating data and the second involving home position data. Lectrolarm proposes that the function of the storing means is “to store the operating data inputted by the user through the control pad, buttons, and switches on the operating panel” and “to store home position data inputted using the control pad, buttons (including the home position buttons), and switches on the operating panel.” Defendants want to define the function of the storing means as “to store the operating data” and “to store home position data.”

The court has already defined “operating data” and “home position data.” The court has also defined the means by which both types of data are input into the invention. There is no reason to repeat these definitions in the definition of the function of the storing means. The court defines the function of the storing means as “to store the operating data and to store home position data.”

2. The Structure of the Storing Means

Lectrolarm proposes that the structure of the storing means “includes a random access memory at the transmitting side and a random access memory at the receiving side, as well as any CPU components necessary to effect the storage function.” The Defendants argue that the structure of the storing means “is a random access memory at the transmitting side, as well as any CPU components necessary to effect the storage function.” The parties’ dispute centers on whether the receiving side random access memory (“RAM”) stores operating or home position data.

The specification makes five references to operating data being stored on the transmitting side RAM for the automatic operation of the camera. U.S. Patent No. 4,974,088, Column 4:29-31; 5:19-21; 5:38-41; 5:49-52; 6:9-10. Nowhere does the specification refer to operating data being stored on the receiving side RAM.^{FN10} The plain language of the specification suggests that operating data is stored only on the transmitting side RAM.

^{FN10} In support of its position that the structure of the “storing means” includes the receiving side RAM, Lectrolarm cites the following language from the specification: “[t]he output signal from the CPU35 and the CPU 33 of the receiving side is operated based on this stored data and the program stored in the ROM 34.” U.S. Patent No. 4,974,088, Column 4:60-63. Lectrolarm argues that, if the court corrects a scrivener’s error and changes “CPU35” to “RAM 35,” this passage supports its position that operating data is stored in the receiving side RAM.

Making the change proposed by Lectrolarm causes the sentence to read “[t]he output signal from the RAM 35 and the CPU 33 of the receiving side is operated based on this stored data and the program stored in the ROM 34.” This sentence makes no sense. A scrivener’s error exists, but Lectrolarm has not proposed the appropriate correction.

The only type of signal that the specification describes as passing from the transmitting side to the receiving side is the output of the transmitting side CPU. U.S. Patent No. 4,974,088, Column 4:41-52. The specification describes the transmitting side CPU as “perform[ing] automatic operation.” U.S. Patent No. 4,974,088, Column 5:64-65. Nowhere does the patent describe the receiving side CPU as directing the automatic operation of the camera when that operation is reciprocating motion between points. This omission suggests that the information sent from the transmitting side CPU is not raw operating data, but instructions about how the receiving side CPU should move the camera base.

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The patent, however, also describes automatic operation that is performed by the receiving side CPU. When an external sensor detects an abnormal condition and outputs an emergency signal, the CPU of the receiving side causes the television camera to rotate to the home position from which the emergency signal was sent. U.S. Patent No. 4,974,088, Column 6:28-40. During this type of automatic operation, the receiving side CPU drives the camera base. If the receiving side CPU can cause the camera to move to a home position during automatic operation, home position data must be stored on the RAM of the receiving side.

*17 The parties also dispute whether the construction should begin with the words "the structure of the storing means is" or the words "the structure of the storing means includes." The construction of the corresponding structure in a means-plus-function claim involves identifying the specific structures in the specification linked to the claimed function. Gemstar-TV Guide Intern., Inc. v. International Trade Com'n, 383 F.3d 1352, 1361 (Fed.Cir.2004). If the court describes the structure of the storing means as "including" the corresponding structures found in the specification, it is possible that structures not in the specification are part of the storing means. The court will use the phrase "the structure of the storing means is ..." in its recitation of the structure of the storing means.

The court finds that the structure of the storing means in Claim 2, ¶ 3, Claim 3, ¶ 3, and Claim 4, ¶ 3 "is a random access memory at the transmitting side and a random access memory at the receiving side, as well as any CPU components necessary to effect the storage function."

3. Random Access Memory

Lectrolarm proposes that "random access memory" should be construed to mean:

"a read/write memory that permits access to any of its address (storage) locations in any desired sequence with similar access time to each location."

The Defendants would interpret "random access

memory" to mean:

random access memory is completely synonymous with RAM and means a volatile memory that permits access to any of its address (storage locations in any desired sequence with similar access time to each location, and that also has a read access time that is similar to its write access time. RAM is one of two mean classes of electronic memory that are mutually exclusive, the other class of which is ROM. RAM includes static RAM and dynamic RAM. ROM includes masked ROM, PROM, EPROM, and EEPROM (including flash memory).

The parties agree that to a person of skill in the art the terms "random access memory" and "RAM" can have different meanings but disagree about which definition applies in the '088 patent. (Pl.'s Br. at 81.) In particular the parties disagree about whether "random access memory" includes both volatile and non-volatile memory.

The claim states that the storing means includes a "random access memory." U.S. Patent No. 4,974,088, Column 10:48-49. The structure that performs the function claimed in a means-plus-function claim must be disclosed in the specification. *See, e.g., Gemstar*, 383 F.3d at 1361. The specification never uses the words "random access memory;" it uses the term "RAM" extensively. The court concludes that the phrase "random access memory" in the claim refers to the term "RAM" in the specification. Because these terms are used in conjunction with a means-plus-function claim, it is the duty of the court to construe the term used to disclose a structure in the specification, not in the claim. Therefore, "random access memory" is defined as "RAM" as that term was understood in 1989.

*18 The specification includes structures labeled RAM and structures labeled ROM. The patent clearly contemplates that RAM and ROM are different. Whatever definition the court chooses for RAM must exclude ROM as that term was understood in 1989.

Whether the definition of "random access memory" includes both volatile and non-volatile memory depends on the definitions of "RAM" and "ROM" to a person of ordinary skill in the art in 1989. Lectrolarm has presented the definition of "random access" from

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the fourth edition of the *IEEE Dictionary*, which was printed in 1988:

random access (computing systems). (1) Pertaining to the process of obtaining data from, or placing data into storage where the time required for such access is independent of the location of the data most recently obtained or placed in storage. (2) Pertaining to a storage device in which the access time is effectively independent of the location of the data.

IEEE Dictionary, 411 (4th ed.1988). This definition does not address the term "RAM," the issue of volatility, or the difference between "RAM" and "ROM."

Absent illuminating intrinsic evidence or useful dictionary definitions or treatises from the relevant time period, extrinsic evidence should be consulted. *Vitronics*, 90 F.3d at 1584. The intrinsic evidence demonstrates only that "RAM" and "ROM" are different, it does not discuss how they are different. The parties have not offered any dictionary definitions or treatises from the relevant time period that discuss the difference between "RAM" and "ROM." Therefore, any extrinsic evidence can assist in construing the term "random access memory."

The distinction between "RAM" and "ROM," and whether "RAM" includes both volatile and non-volatile memory, was argued extensively in *Pelco*. (*Pelco* Decision at 85.) The *Pelco* court heard testimony from experts for both Lectrolarm and Pelco and appointed an independent expert to present evidence on the issue. The *Pelco* court determined that "[i]n 1988 the terms RAM and ROM were mutually exclusive. The Random Access memory (RAM) referred to in the patent is a volatile memory with fast write capability and similar read and write times." (*Pelco* Decision at 84.) The *Pelco* court disposed of the issue as follows:

A court appointed expert consultant testified October 15, 2002. His testimony unequivocally establishes that Random Access Memory (RAM) as used in the '088 patent, is volatile and that as of 1988, to one skilled in the art, the term ROM, including PROMs, CPROMs, and EEPROMs, were mutually exclusive from Random Access Memory (RAM). The definition of random access memory, RAM, as used in the

'088 patent, is interpreted as a volatile memory with high-speed read-write memory that permits access to any of its address (storage) locations in any desired sequence with similar access time to each location.

(*Pelco* Decision at 85.) Both Lectrolarm's expert, Dr. Rhyne, and the Defendants' expert, Dr. Horowitz, agree that "RAM" means a volatile memory. (Rhyne Decl., ¶ 58; Horowitz Report, ¶ 36.) ^{FN11}

^{FN11}. Lectrolarm's expert Dr. Rhyne included in his expert report citations from a number of dictionaries and treatises that suggest that around 1989 the term "RAM" was a synonym for "random access memory" and would have included non-volatile memory. This argument misses the central point. The question is not whether the term "RAM" when presented in isolation would have been understood by a person of skill in the art in 1989. The question is what a person of skill in the art would have understood "RAM" to mean when presented in the context of a document showing it to be something different from "ROM."

*19 The court construes "random access memory" as "synonymous with the term 'RAM' as that term was used in 1988, but not including 'ROM' as that term was understood in 1988. It is a volatile memory that permits access to any of its address (storage) locations in any desired sequence with similar access time to each location. ROM includes masked ROM, PROM, EPROM, and EEPROM."

H. The Controlling Means (Claim 2, ¶ 4; Claim 3, ¶ 5; Claim 4, ¶ 5)

Claim 2, ¶ 4 discusses a "controlling means." Claim 3, ¶ 5, and Claim 4, ¶ 5 both refer back to the controlling means of Claim 2 and recite additional functions the controlling means must perform. The parties agree that the claim for a "controlling means" is a means-plus-function claim. The parties disagree about the correct construction of the function and the corresponding structure of the claim.

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1. The Function of the Controlling Means

Claims 2, 3, and 4 recite three functions of the controlling means. Lectrolarm proposes that the functions of the controlling means are: "to control the automatic operation of the rotating camera base using the previously stored operating data," "to position the rotating camera base into prescribed home positions in response to signals originating from the home position switches on the operating panel using the home position data previously stored in RAM," and "to move the camera to the pre-programmed home position corresponding to the external sensor sending the 'emergency' signal." The Defendants agree with Lectrolarm's proposed construction, but would replace the words "using the" in the first two clauses of Lectrolarm's offered language with the words "based on."

The court agrees with the Defendant's position. The patent claim uses the words "based on" rather than "using the" to describe the relationship between the stored data and the operation of the camera base. The term "based on" is not a technical term that the court need construe. It can be understood by the fact finder without any guidance from the court.

2. The Structure of the Controlling Means

The parties agree that the structure of the controlling means "is the transmitting side CPU, the receiving side CPU, the drive circuit, and the stepper motors." Two of the Defendants, GE Interlogix and Bosch, propose that the structure of the controlling means also includes "the mechanisms disclosed in the '088 patent by which the transmitting side CPU communicates with the receiving side CPU." The parties' dispute centers on whether the structures that connect the transmitting and receiving side CPUs are a part of the structure of the controlling means.

The function of the controlling means "is to control the automatic operation of the rotating camera base based on the previously stored operating data." The structures identified in the construction of a means-plus-function claim must do more than simply enable the recited function disclosed in the claim; they must actually perform the function and must be clearly linked to the function by the specification. See *Asyst Technologies, Inc. v. Empak, Inc.*, 268 F.3d 1364,

1371 (Fed.Cir.2001). In *Asyst Technologies* several means-plus-function claims were at issue. In one claim, the structure of a "second microprocessor means for receiving and processing digital information" was found to include only the microprocessor, not the communication lines that transmitted information to the microprocessor. *Id.* In another claim, the structure of the "fourth means ... for controlling [the receipt of the transportable containers and the processing of the articles within the containers] and for transmitting information related to the processing performed [to the container]" was found to include the local process controller, the communication means, and "necessarily includes [the] structure that connects the two, i.e. [the] communication line." *Id.* at 1372.

*20 This case is similar to the second example recited from *Asyst Technologies*. There is no dispute about whether the controlling means includes the transmitting and the receiving side CPUs. The controlling means must then "necessarily" include the structures that connect the two.

Defendants Sensormatic and Vicon argue that the specification does not clearly link the means by which the two CPUs communicate with the controlling function. Sensormatic and Vicon also argue that the communication means between the two CPUs merely enables the process of controlling the camera base and does not actually perform the controlling function. The communication line involved in the "fourth means" in *Asyst Technologies* was not closely linked, by either the specification or by the task it performed, to the function recited in the means-plus-function claim. Nevertheless, the *Asyst Technologies* court found that any structure connecting the two structures identified as corresponding structures was necessarily also a corresponding structure.

The court finds that the structure of the controlling means "is the transmitting side CPU, the receiving side CPU, the drive circuit, the stepper motors, and the mechanisms disclosed in the '088 patent by which the transmitting side CPU communicates with the receiving side CPU."

I. Ultrasonic vs. Supersonic (Claim 4, ¶ 4)

Lectrolarm proposes a construction of Claim 4, ¶ 4

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that includes the language "the external sensors are infrared, supersonic, or other detectors, not limited to those disclosed in the specification...." Defendants would replace the word "supersonic" in Lectrolarm's proposed construction with the word "ultrasonic." The patent states that "supersonic or infrared sensors" can be used as an external sensor. U.S. Patent No. 4,974,088, Column 4:35-37. The Defendants have not argued that a scrivener's error exists in the patent. The court adopts Lectrolarm's proposed claim language.

J. Structure of the Disabling Means (Claim 5, ¶ 2)

Lectrolarm proposes that the structure of the disabling means be "a switch located on the operating panel of the control box." The Defendants would like the structure of the disabling means to be "a switch located on the operating panel of the control box, that is electrically connected to the external sensor." The parties' dispute centers on whether the electrical connection from the switch on the control box to the camera base is part of the structure of the disabling means.

The structures identified in the construction of a means-plus-function claim must do more than simply enable the recited function disclosed in the claim. The structures must actually perform the function and must be clearly linked to the function by the specification. See Asyst Technologies, Inc. v. Empak, Inc., 268 F.3d 1364, 1371 (Fed.Cir.2001). As already discussed, in Asyst Technologies the federal circuit found the structure of a "second microprocessor means for receiving and processing digital information" to include only the microprocessor, not the communication lines that transmitted information to the microprocessor. *Id.* at 1371.

*21 The parties agree that "the function of the disabling means is to prevent the controlling means from causing the camera to rotate to the home position corresponding to the external sensor from which an 'emergency' signal is received." The electrical connection between the disabling means and the camera simply enables the disabling means to perform its function, it does not perform the function itself. This is analogous to the communication line in Asyst Technologies that transmitted information to the microprocessor but was not construed by the court to be a

structure involved in actually performing the disclosed function. The court adopts Lectrolarm's proposed construction and defines the structure of the disabling means as "a switch located on the operating panel of the control box."

K. Structure of the Display Means (Claim 5, ¶ 3)

Lectrolarm proposes that the structure of the display means be "a set of indicator lights, each associated with a particular home position button on the operating panel, which indicate the presence or absence of 'emergency' signals from corresponding external sensors." The Defendants would like the structure of the displaying means to be "a set of indicator lights, each associated with a particular home position button on the operating panel, which indicate the presence or absence of 'emergency' signals from corresponding external sensors. The set of indicator lights is electrically connected to the external sensor." The parties' dispute centers on whether the electrical connection from the indicator lights to the sensor is part of the structure of the disabling means.

The dispute about the structure of the display means is identical to the dispute about the structure of the disabling means in the preceding section. The court adopts Lectrolarm's position and defines the structure of the display means as "a set of indicator lights, each associated with a particular home position button on the operating panel, which indicate the presence or absence of 'emergency' signals from corresponding external sensors."

VI. Motion for Summary Judgment of Invalidity of Claim 6 ^{FN12}

^{FN12.} The Defendants' motion seeks summary judgment on Claims 6 and 7 of the '088 patent on the grounds of invalidity. Lectrolarm has not asserted that the Defendants infringed Claim 7 of the '088 patent, and there is no need for the court to consider whether Claim 7 is invalid.

Patent claims must "particularly point out and distinctly claim the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. This

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requirement is known as definiteness. Determination of claim indefiniteness is a legal conclusion that is the responsibility of the court. Exxon Research and Engineering Co., v. United States, 265 F.3d 1371, 1376 (Fed.Cir.2001). The test for definiteness is whether "one skilled in the art would understand the bounds of the claim when read in light of the specification." *Id.* at 1375. "Because a claim is presumed valid, a claim is indefinite only if the claim is *insolubly* ambiguous, and no narrowing construction can properly be adopted." Honeywell Intern., Inc. v. International Trade Com'n, 341 F.3d 1332, 1338-39 (Fed.Cir.2003) (emphasis added) (internal quotes and citations omitted).

*22 The parties' dispute centers on the definition of the term "photocoupler." Lectrolarm argues that a photocoupler consists of a light-emitting and a light-receiving diode that are not necessarily located in the same discrete device. The Defendants contend that a photocoupler must be a discrete package containing both a light-emitting and a light-receiving diode.

Paragraphs 3 and 4 of Claim 6 involve the photocoupler:

a photocoupler including a light-emitting element that transforms said electrical signal from said control box to a light signal, said light-emitting element being provided in said control box,

said photocoupler further including a light-receiving element that transforms the light signal from said light-emitting element to an electrical signal and outputs the electrical signal to said rotating camera base, said light-receiving element being provided in said rotating camera base....

U.S. Patent No. 4,974,088, Column 12:5-14. The claim itself defines the term "photocoupler" to include a light-emitting diode and a light-receiving diode at two separate locations. A person of skill in the art reading only the claims would understand that the use of the term "photocoupler" in the claims does not require that the light-emitting and receiving diodes be in a discrete package.

The specification discloses a definition of "photocoupler" consistent with that in the claims. The specification refers to light-emitting and light-receiving element pairs in discrete packages as photocouplers. The specification also describes light-receiving and light-emitting element pairs where the two elements are at different locations. Although the specification does not refer to this second configuration explicitly as a "photocoupler," it is obvious from the context of the patent that this is the "photocoupler" referred to in Claim 6.

The word photocoupler was added to the claim during the amendment process. The Defendants argue that to give "photocoupler" any meaning other than its ordinary meaning would impermissibly "read out of the claim the only element that preserved the issued Claim 6 from a finding of invalidity by the patent office." (Def.'s Post-Hearing Mem. Concerning Claim Interpretation Issues at 15.) To the contrary, the patent examiner rejected Claim 6 because communication between the two sides of the device using a light-emitting and receiving element pair and optical cable is a "well known technique" for communication and would have been "obvious to one of ordinary skill in the art." (Examiner's Action at 3 (January 18, 1990).) The attorney prosecuting the patent responded by adding the word "photocoupler" to paragraphs 3 and 4 of Claim 6. The attorney explained that the addition of the word "photocoupler" clarified that the optical link was not only a means of communication, but also a way to reduce noise. (Patent Attny.'s Resp. to Patent Rejection at 5-7.) This amendment, with its accompanying explanation, was accepted. Because the amendment purpose of noise reduction as well as communication the amendment did not limit the scope of the '088 patent.

*23 The term "photocoupler" in Claim 6 is not *insolubly* ambiguous. Irrespective of the ordinary meaning of the term "photocoupler," a person of skill in the art reading the claims and specification of the '088 patent would understand that the patent uses the term "photocoupler" in a manner that encompasses light-emitting and light-receiving element pairs where the elements are at different locations and not in a discrete packet. Claim 6 of the '088 patent is not indefinite.

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VII. Conclusion

For the foregoing reasons, the court DENIES the Defendants' motion for summary judgment on Claims 6 and 7 of the '088 patent and construes Claims 1 through 6 of the '088 patent as follows:

Claim 1

A remote control apparatus that operates a television camera base rotatable in the horizontal (pan) and vertical (tilt) directions, said remote control apparatus comprising:

A first controlling means. The function of the first controlling means is to output a digital signal consisting of instructions to position the camera base. The structure of the first controlling means is the transmitting side CPU, and equivalents thereof.

A device for 1) receiving said digital signal for driving and controlling said rotating camera base outputted from said first controlling means; 2) modulating said digital signal onto a carrier wave; and 3) demodulating said signal to recover the digital information from the modulated carrier wave.

A modem is a device that modulates digital information onto a carrier wave and demodulates the signal to recover the digital information from the modulated carrier wave.

Carrier wave is a continuous wave, of sinusoidal or non-sinusoidal form, capable of being modulated or impressed with a signal.

A modulating circuit is a circuit that modulates a digital signal onto a carrier wave. The modulating circuit is one of the component parts of the control box. The modulating circuit is electrically connected to the first controlling means on the transmitting side and electrically connected to the demodulating circuit on the receiving side.

A demodulating circuit is a circuit that recovers a

digital signal that has been modulated onto a carrier wave. The demodulating circuit is one of the component parts comprising the camera base. The demodulating circuit is electrically connected to the modulating circuit on the transmitting side and electrically connected to the second controlling means on the receiving side.

A set of component parts on the transmitting side of the remote control apparatus, collectively referred to as a control box, including a circuit that modulates a digital signal onto a carrier wave, said circuit being electrically connected to the transmitting side CPU.

Said demodulating circuit that 1) recovers the digital signal that has been modulated by said modulating circuit onto a carrier wave; 2) is one of the component parts comprising the camera base; and 3) is electrically connected to said modulating circuit.

*24 A second controlling means. The function of the second controlling means is to position the rotating camera base in response to the digital signal received from the demodulating circuit. The structure of the second controlling means is the receiving side CPU along with the drive circuit and stepper motors in the camera base, and equivalents thereof. The second controlling means is electrically connected to the demodulating circuit.

Claim 2

A remote control apparatus for operating a television camera base rotatable in the horizontal (pan) and vertical (tilt) directions, said remote control apparatus comprising:

An input means. The function of the input means is to input operating data for the automatic positioning of the rotating camera base. The structure of the input means is the control pad and a set of buttons and switches (including switches for inputting pan and tilt speeds, the interval scan switch, the memory set and clear buttons, and switches for

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setting the particular mode of automatic operation) on the operating panel, and equivalents thereof.

Automatic operation is movement of the camera base that is not directly responsive to input from a monitoring person (other than initiation of the automatic operation).

Operating data is data that controls the automatic operation of the camera base, and that is set through use of the structure of the input means.

A storing means. The function of the storing means is to store the operating data and to store home position data. The structure of the storing means is a random access memory at the transmitting side and a random access memory at the receiving side, as well as any CPU components necessary to effect the storage function, and equivalents thereof.

Random access memory is synonymous with the term 'RAM' as that term was used in 1988, but not including 'ROM' as that term was understood in 1988. It is a volatile memory that permits access to any of its address (storage) locations in any desired sequence with similar access time to each location. ROM includes masked ROM, PROM, EPROM, and EEPROM.

A controlling means. The function of the controlling means is to control the automatic operation of the rotating camera base based on the previously stored operating data, to position the rotating camera base into prescribed home positions in response to signals originating from the home position switches on the operating panel based on the home position data previously stored in RAM, and to move the camera to the pre-programmed home position corresponding to the external sensor sending the "emergency" signal. The structure of the controlling means is the transmitting side CPU, the receiving side CPU, the drive circuit, the stepper motors, and the mechanisms disclosed in the '088 patent by which the transmitting side CPU communicates with the receiving side CPU, and equivalents thereof.

Claim 3

A remote control apparatus for operating a television camera base rotatable in the horizontal (pan) and vertical (tilt) directions, said remote control apparatus comprising all of the limitations in Claim 2, wherein:

*25 Said input means further includes a second input means. The function of the second input means is to input home position data. The structure of the second input means is the control pad and a set of buttons (including home position buttons) and switches on the operating panel, and equivalents thereof.

Home position data is information identifying one or more home positions that is set through use of the structure of the second input means. "Home position" is a stored position.

An instructing means is further provided. The function of the instructing means is to send signals to the controlling means that ultimately cause the camera to rotate to a pre-programmed position corresponding to a particular home position button pressed by the user. The structure of the instructing means is the home position buttons and the electrical circuitry connecting the home position buttons to the controlling means, and equivalents thereof.

Claim 4

A remote control apparatus for operating a television camera base rotatable in the horizontal (pan) and vertical (tilt) directions, said remote control apparatus comprising all of the limitations in Claim 2, wherein:

Said input means further includes a second input means described in Claim 3.

External signals in prescribed home positions electrically connected to the controlling means. The external sensors are infrared, supersonic, or other detectors, not limited to those disclosed in the specification, electrically connected to the re-

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ceiving side CPU and the controlling means. Each sensor is associated with a home position. When an external sensor is triggered, it sends an electronic "emergency" signal to the controlling means.

Claim 5

A remote control apparatus for operating a television camera base rotatable in the horizontal (pan) and vertical (tilt) directions, said remote control apparatus comprising all of the limitations in Claims 2 and 4, and:

A disabling means. The function of the disabling means is to prevent the controlling means from causing the camera to rotate to the home position corresponding to the external sensor from which an "emergency" signal is received. The structure of the disabling means is a switch located on the operating panel of the control box, and equivalents thereof.

A display means. The function of the display means is to display the presence or absence of an "emergency" signal coming from an external sensor. The structure of the display means is a set of indicator lights, each associated with a particular home position button on the operating panel, which indicate the presence or absence of "emergency" signals from corresponding external sensors, and equivalents thereof.

Claim 6

A remote control apparatus that operates a television camera base rotatable in the horizontal (pan) and vertical (tilt) directions, said remote control apparatus comprising:

A set of component parts on the transmitting side of the remote control apparatus that outputs an electrical signal for driving and controlling the rotating camera base.

*26 A photocoupler including a light-emitting element that transforms said electrical signal from said control box to a light signal, said light-emitting

element being provided in said control box.

Said photocoupler further including a light receiving element that transforms the light signal from said light-emitting element to an electrical signal and outputs the electrical signal to said rotating camera base, said light receiving element being provided in said rotating camera base.

A transmitting means. The function of the transmitting means is for transmitting the light signal from said light-emitting element to said light-receiving element. The structure of the transmitting means is an optical fiber cable, and equivalents thereof. The transmitting means is connected between the control box and the remote camera base.

A controlling means. The function of the controlling means is to drive and control the rotating camera base based on the signal from the light-receiving element provided in that rotating camera base. The structure of the controlling means is the receiving side CPU along with the drive circuit and stepper motors in the camera base, and equivalents thereof. The controlling means is electrically connected to the light-receiving element provided in that rotating camera base.

So ORDERED.

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